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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,802	04/01/2004	Markus Franciscus Antonius Eurlings	081468-0309013	5303

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

MAIL DATE	DELIVERY MODE
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05/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/814,802

Applicant(s)

EURLINGS ET AL.

Examiner

Stephen Rosasco

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 18-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/14/04, 9/1/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Art Unit: 1756

Detailed Action

Applicant's election without traverse of Group I (claims 1-17) in the reply filed on 2/28/07 is acknowledged.

Claims 1-17 directed to the same invention as that of claims 1-16 of commonly assigned 6,875,545. The issue of priority under 35 U.S.C. 102(g) and possibly 35 U.S.C. 102(f) of this single invention must be resolved.

Since the U.S. Patent and Trademark Office normally will not institute an interference between applications or a patent and an application of common ownership (see MPEP Chapter 2300), the assignee is required to state which entity is the prior inventor of the conflicting subject matter. A terminal disclaimer has no effect in this situation since the basis for refusing more than one patent is priority of invention under 35 U.S.C. 102(f) or (g) and not an extension of monopoly.

Failure to comply with this requirement will result in a holding of abandonment of this application.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 1756

Claims 1-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Eurlings et al. (6,875,545) or Fritze et al. (6,934,007) or Sugita et al. (6,534,242).

The claimed invention is directed to a device manufacturing method comprising performing a first exposure by patterning a beam of radiation with a first pattern in its cross-section, said first pattern including a desired dark isolated feature in a bright local region and being dark proximate the bright local region; and projecting the patterned beam of radiation onto a target portion of a layer of radiation-sensitive material on a substrate; and performing a second exposure by patterning the beam of radiation with a second pattern in its cross-section, said second pattern being dark in a region substantially corresponding to said bright local region and bright in a wider region around said local region; and projecting the patterned beam of radiation onto the target portion of the layer of radiation-sensitive material; wherein said first and second exposures are carried out in either order; and wherein first illumination settings are used in said first exposure and second illumination settings are used in said second exposure, said second illumination settings being different than said first illumination settings.

And wherein said second illumination settings are arranged so that in the second exposure substantially no radiation enters the dark region corresponding to the local bright region in the first exposure.

The applicant discusses the advantages over the prior art in that by optimizing the illumination settings for the two exposures separately, it is possible to maximize the DOF and exposure latitude for the dark-isolated feature. In some cases, the illumination mode for the second exposure is preferably arranged so that substantially no light enters the dark region corresponding to the local bright region in the first exposure. In other cases, the out-

Art Unit: 1756

of-focus behaviors of the first and second exposures can be arranged to cancel each other out so as to provide a combined depth of focus greater than the depths of focus of either exposure separately. Experiments or simulations can be used to determine which approach is most appropriate for a given pattern to be exposed.

Here, the target feature dimension is the dimension of the feature in resist after development that is aimed at. Fabrication of a circuit pattern involves the control of space tolerances between features, and of feature dimensions. In particular the control of the smallest such space and/or dimension permitted in the fabrication of the device is of importance. The smallest space and/or smallest width is referred to as the critical dimension; the target feature dimension generally is a critical dimension in the present context, and therefore may also be referred to, hereinafter, as the critical dimension, or CD, or target

Eurlings et al. addresses the claimed invention, in particular they teach (see claims) a method of transferring a lithographic pattern onto a substrate by use of a lithographic apparatus, said method comprising the steps of: defining features to be printed on said substrate; determining which of said features require assist features to be disposed adjacent thereto in order for said features to be printed within defined resolution limits; generating a mask containing said features to be printed and said assist features; performing a first illumination process so as to print said features on said substrate, said first illumination process resulting in the partial printing of said assist features on said substrate, said first illumination process including a dipole illumination of said substrate; and performing a second illumination process so as to reduce the amount of said assist

Art Unit: 1756

features printed on said substrate; said second illumination process comprising the step of performing a quadrupole illumination.

Fritze et al. (see especially claims 20-22 and 33-63) addresses the invention as claimed, including a method of forming a feature pattern on a substrate, comprising: (a) exposing the substrate, using a mask having a pattern of features thereon, with X-dipole illumination, to produce a dense feature illumination pattern on the substrate, the X-dipole illumination using a phase shifter in a dipole illuminator so as to shift the created pattern in Cartesian space; and (b) exposing the substrate, using the same mask having the pattern of features thereon, with Y-dipole illumination, to produce a dense feature illumination pattern on the substrate.

Sugita et al. addresses claims 1-3 (see claims) an advantage of a dual exposure method wherein a depth of focus remarkably larger than that by ordinary exposure can be provided.

And further teach performing the second exposure step by use of plural masks having different patterns.

Sugita et al. also teach that in accordance with dual exposure based on projection exposure of an ordinary circuit pattern image and projection exposure of a periodic pattern image, providing a high contrast image, the contrast of an exposure amount distribution of a very fine pattern image less than the resolution limit (i.e., usually unresolvable) can be improved significantly. By setting the light quantity ratio k appropriately by suitably setting the illumination condition for the circuit pattern and the illumination condition for

Art Unit: 1756

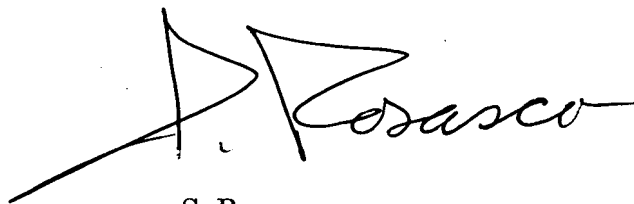
the periodic pattern, an exposure amount distribution (the one after dual exposure) with which the contrast level that can be resolved by a resist used can be accomplished. FIG. 58 shows the results.

Sugita et al. (col. 57, lines 49-59) also addresses claims 4 and 7, the effective light sources of the illumination system may be based on oblique incidence illumination with quadrupole illumination in which four effective light sources are disposed at 0 deg., 90 deg., 180 deg., and 270 deg., as shown in FIG. 83.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, elongated initial 'S'.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
4/30/07